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(54) PRODUCTION OF OPTICAL MEMBER FOR EXCIMER LASER

(57) Abstract:

PROBLEM TO BE SOLVED: To produce a quartz glass optical member having excellent stability for irradiation of UV laser, especially excimer laser such as KrF and ArF.

SOLUTION: The quartz glass is produced in the following processes. The starting source material obtd. from halogenated silicones, alkoxy silanes, alkyl alkoxy silanes or the like is subjected to oxidation heat treatment in the temp. range between $\approx 600^{\circ}\text{C}$ and $\leq 1500^{\circ}\text{C}$ to decrease the

hydrogen concn. to $\leq 5 \times 10^{16}$ molecules/cm³ as well as to decrease reducible defects. Then the quartz glass is kept at the temp. range between $\approx 200^{\circ}\text{C}$ and $\leq 600^{\circ}\text{C}$ in a hydrogen-contg. atmosphere to control the hydrogen concn. to $\approx 1 \times 10^{17}$ molecules/cm³. Further, the quartz glass is treated to produce uniform distribution of the hydrogen concn. at the temp. range between $\approx 300^{\circ}\text{C}$ and $\leq 800^{\circ}\text{C}$ in an atmosphere of air, inert gas, hydrogen, mixture gas of hydrogen and inert gas, or mixture gas of air and inert gas. Thus, the quartz glass optical member having stable and excellent durability against laser can be obtd.

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